JOINT INTEGRATION TEST FACILITY (JITF) TEST APPROACH

FOR

ENTERPRISE (WEB-BASED) APPLICATIONS

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SECTION 1

1. TEST CRITERIA FOR DODIIS APPLICATIONS

1.1 PURPOSE

The Department of Defense Intelligence Information System (DODIIS) Management Board (DMB) has directed the Joint Integration Test Facility (JITF) to conduct testing as part of the DODIIS Certification Process. This level of testing verifies infrastructure compliance, identifies resource conflicts, and identifies the operational impacts of applications residing in a common DODIIS environment.

The purpose of this document is to define the test approach for Enterprise, or web-based, applications. This test approach will be the basis for all testing that the JITF performs for such applications.

For the purposes of this document and for continuity with other DODIIS testing documents, an enterprise application is an application designed for user access to some or all application functions via a web browser. Functions are implemented using the capabilities of the browser.

Enterprise applications may rely solely on web browser services or may require additional products, such as plugins or helper applications that must be installed on the client platforms.

The term Intelligence Mission Application (IMA) applies to enterprise applications as well as client-server or legacy applications.

1.2 CRITERIA FOR TESTING

Enterprise applications may seem to require less testing than applications based on other architectures (e.g., client/server). However, the necessity for testing is not eliminated for enterprise applications. The extent of testing required for any application is based upon a set of criteria that is independent of the architecture implemented by the application. The criteria listed below identify the need to test applications in order to deliver software that meets functional requirements and possesses acceptable quality. The criteria can be used to prioritize testing of applications as well as to determine the level of test effort that is applied to each application entering the test process.

1. Number of users/number of sites that use the application – This may be the most important criterion for determining the order in which applications are tested. This is true regardless of the architecture and design of the application. For web-based applications, the issue is not the number of platforms on which the application is installed but the number of users (i.e, the customer base) who are anticipated to access the web server. This criterion is a measure of the importance of the application to the DODIIS community.

   The number of users also is an important factor for evaluation of the performance of the application. In the context of performance evaluation, the number of users is measured in terms of simultaneous access and number of connections in a fixed period of time.

2. Effect of failure or down time on site missions – This must be evaluated in conjunction with the number of users/number of sites that use the application. Clearly, the consequence of an application's failure or down time must be assessed. A system whose failure is relatively minor may not require the scrutiny of a more critical system, regardless of the number of users it attracts.

3. Server installed at sites versus single server at central location – The more sites at which the application server is installed, the higher is the possibility that the application could affect site resources. At this time, applications with thin (web-based) clients are still installing servers at more than one location.

4. Level of effort to install, configure, and manage system – For systems that are installed at sites, the level of effort required to install, configure, and manage the system must be assessed. This is done in the current process. For applications that have single servers, this type of evaluation is still useful because it can assist the PMO to improve the delivery and quality of the system.

5. Compatibility of server and browsers - There are several web-based server products that can and are being used in DODIIS mission applications. At the same time, there are also several browser products (e.g., Netscape and Internet Explorer) that are used in the DODIIS community, and the compatibility issues between server products and browser products must be evaluated.

6. Complexity of client installation and use – For applications that require installation of software on client platforms, testing is clearly required to identify installation, integration, and usage problems.

   Thin (web-based) clients require an evaluation of their complexity or level of effort to use. This evaluation is based upon browser compatibility (including both versions and products), browser settings, and plug-ins required for use of the application. Applications that use Java applets introduce a level of complexity that, by direction of the DMB and stated in the *DODIIS Instructions 2000*, must be evaluated.

7. Performance - As the number of enterprise applications increases, the performance burden for a site will also increase. Performance should be evaluated in the following categories:

   Network resources (bandwidth, name services, firewall configuration)
   Client resources
   Server resources

8. Usability – This is manifested in the implementation of functional requirements as well as the overall quality and stability of the application. Two areas that are evaluated for usability in the current test process are documentation and user interface. The current process addresses both areas regardless of architecture selection (i.e., client-server or web-based).

9. Integration Security - As defined by the current process, security certifiers focus on the security requirements of individual applications. Integration testing examines the effects on the infrastructure and on other applications that are caused by design and implementation

decisions made by applications. Implementation decisions that are reasonable and meet security requirements for the individual application may have unexpected and possibly negative consequences on site or enterprise resources. Implementation decisions of functions not related to security may also affect the security posture of a site or of the enterprise. As more reliance is placed on remote servers, the potential for server penetration by a remote user increases. Likewise, the acceptance of remote management of some services increases the possibility of penetration of site resources by a remote user.

2. JITF TEST PROCESS AND APPROACH FOR ENTERPRISE APPLICATIONS

The JITF test process consists of several steps:

1. Joint Test Planning Meeting (JTPM)
2. Document Review
3. Work plan generation and coordination
4. Joint Test Readiness Review (JTRR)
5. Testing – including installation and configuration testing, integration testing and Independent Validation and Verification (IV&V) testing
6. Test report generation

2.1 JOINT TEST PLANNING MEETING (JTPM)

At the JTPM, which normally occurs three months before JITF testing begins, the objectives for testing an IMA are identified, and issues that may affect the outcome of testing are discussed. The program manager is given a work plan to complete so that all resources required for testing will be identified with sufficient time to ensure that they are in place before testing begins.

JTPM expenditures can be minimized through use of videoconferencing and teleconferencing.

Test schedules must be planned well in advance of any formal test activity for enterprise applications. JITF test schedules are determined several months in advance and resources are constrained. With adequate advanced scheduling, all programs that undergo JITF testing can be supported without requiring additional resources. This means that the test approach for enterprise applications or any IMA that may have an aggressive fielding scheduled can be implemented without negatively affecting other DODIIS programs.

A streamlined JTPM process has been used for several programs that have gone through the DODIIS Certification Process. However, there are risks associated with an abbreviated planning approach. It is normally applied to individual versions of software rather than to the program as a whole. A compressed timeframe between JTPM and the start of testing is difficult to achieve unless an Integrated Product Team (IPT) approach is used.

The DODIIS Test Study Working Group recommended the IPT model as a highly useful concept to ensure that adequate quality is built into software programs. It is already a necessary function for other Intelligence Community programs, and the JITF believes that it can greatly contribute to the success of IMAs that employ the same concept.

The JITF would participate as a member of the IMA IPT. The IPT would be involved in all program level reviews and would contribute towards the definition of success/exit criteria for each milestone in the IMA lifecycle. The IPT will include subject matter experts to whom the PMO

can refer to ensure quality, efficient resource usage and timely delivery of critical IMA products. The JITF recommends that IPT members include representatives from the JITF, user community, acquisition, Joint Interoperability Test Command (JITC), DODIIS Life Cycle Management (LCM), and security. The JITF also recommends that the 497IG, as DODIIS Executive Agent for Test and Evaluation (DexA for T&E), participate in the IPT.

JITF participation in the IPT would ensure that integration and other testing requirements are addressed at the start of the release build process for the IMA. JITF involvement will also dramatically reduce the time required to generate operational assessment procedures and to execute operational assessment tests. Increased communication and involvement ensures understanding of IMA components, allowing the JITF to focus test preparation activities on procedure development, rather than information gathering. The IPT process will also ensure that products supporting test and deployment decisions are created at the most efficient time in the program lifecycle, improving coordination and eliminating confusion.

2.2 DOCUMENTATION REVIEW

To efficiently shorten the time between JTPM and testing, requirements for the enterprise and documentation for candidate applications must be available to the JITF well in advance of the start of testing. Otherwise, any gain in time due to the streamlined JTPM will be lost because of the time required to review documentation and prepare test cases and procedures. Actual delivery dates are dependent upon the scope of change for the IMA baseline.

2.3 WORKPLAN

For enterprise applications, the work plan for testing will be prepared jointly by the PMO and the JITF. The work plan must address resources at the IMA test location (i.e., for the IMA server) and resources at the JITF test facility. In the work plan, the PMO will specify the resources necessary to install and operate the IMA components, and the JITF will specify the resources that it will require for on-site testing at the IMA test location and for remote testing from the JITF facility at Rome, New York.

2.4 JOINT TEST READINESS REVIEW

The JTRR usually occurs shortly before the scheduled start of testing to confirm that all actions and milestones for testing have been met. It is not necessary to change this part of the test process for Enterprise or web-based testing.

2.5 TESTING

Testing of the IMA architecture and component products will be performed in two phases.

The first phase is on-site testing at the IMA test location. During this phase, installation testing and integration evaluation of the enterprise server will be performed. The JITF test team does not necessarily need to perform the actual server installations. This decision is based upon the testing criteria previously discussed. However, observing the installations provides insight into the architecture and approach of the enterprise application that will, in turn, provide value to the PMO. There may be instances in which the JITF feels it necessary for the JITF test team to perform the installation and the JITF reserves the right to make that decision. This determination would be made at or shortly after the JTPM for that test.

The second phase is evaluation of the client applications of the enterprise application. While part of this evaluation may occur at the IMA test location, the JITF will perform the majority of the evaluation remotely from the JITF test environment at Rome, New York. The JITF has the resources to install software (IMA applications or any other software) on any of several infrastructures (e.g., Client Server Environment-System Services (CSE-SS), Defense Information Infrastructure Common Operating Environment (DII COE), NT) and to evaluate the integration and interaction of the application with each infrastructure.

2.5.1 Integration Test Objectives

The objectives of integration testing conducted by the JITF are to perform analyses and provide recommendations to users, PMO, DMB, Engineering Review Board (ERB)/Systems Integration Management Office (SIMO), and the DExA for T&E, regarding integration testing results. The evaluation of integration quality of the IMA/enterprise product is based on the integration requirements specified in the *JITF DoDIIS Integration Requirements and Evaluation Procedures for Enterprise (Web-Based) Applications*. Each requirement is reviewed for applicability to the version of the application/enterprise under evaluation.

The criteria for evaluation of any IMA are grouped in the following categories:

- Documentation
- Installation and Configuration
- Operation
- Environment
- User Interface
- Integration security

For each category, the JITF identifies and reports specific findings. The findings are analyzed to determine the effect each finding will have on the overall quality of the IMA.

Integration evaluation of the servers will require console access to the server and access to server resources as root or administrator (for NT servers). Evaluation of servers is non-intrusive; root or administrator access is required in order to have the permissions necessary to examine resources and configurations that are pertinent to integration evaluation.

2.5.2 Operational Assessment of Enterprise Applications

Figure 2-1 illustrates the role of the JITF in operational assessment of enterprise applications. The diagram illustrates that the JITF will employ both on-site and remote testing, two approaches that are already incorporated into the JITF Concept of Operations (CONOPS).

The JITF test process is well suited to evaluating software, recording and tracking test findings, and reporting this information to the appropriate recipients. The test process can be used for each application that is tested by the JITF and includes:

a. Receipt and review of application documentation

b. Participation of the JITF in technical exchanges and meetings - This should be done on an as-needed basis so that the JITF can stay current with the concepts and processes

of the IMA. The meetings should make as much use of video teleconferencing (VTC) and teleconferences as possible.

c. Development of test plans and procedures - In the absence of appropriate documentation, this will be accomplished by the JITF.

d. Problem reporting - The JITF can maintain and track problem reports in its own configuration management (CM) data base and/or report problems directly to the PMO.

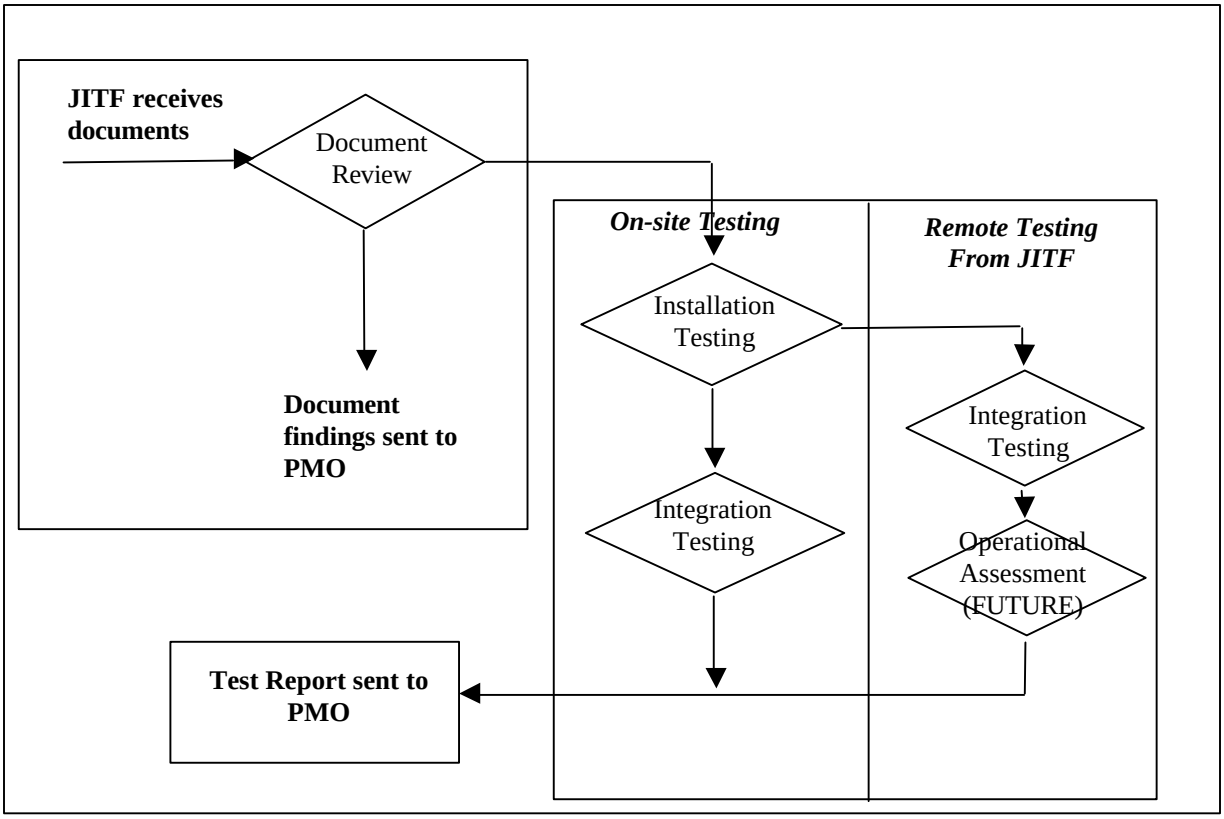

Figure 2-1 Test Approach for Enterprise Applications

Operational assessment will focus on IMA services that are accessible by users from DODIIS sites. It will be performed remotely from the JITF using the appropriate network facilities (e.g., MILNET, JWICS, or SIPRNET). Test plans and procedures for testing will be generated as far in advance as possible for each enterprise product.

2.5.3 Test Report Generation

The JITF will follow its current process with respect to reporting and tracking of test findings and to generation of test reports. Documents received from the PMO will be recorded in the Configuration Management (CM) library in Rome, New York. The CM organization will forward test reports and all document and test findings to the PMO at the conclusion of each test.

3. SUMMARY

The test approach described in this document will benefit the PMO and the DODIIS community and will facilitate deployment decisions across DODIIS Management. The JITF has expertise that will assist PMOs in meeting goals and objectives without allocation of additional resources. The actions identified in Section 2 can be easily performed.

The JITF, in conjunction with the 497IG (DExA for T&E) is committed to providing solution-based support to PMOs. Constant process improvement in the test program has been the over arching philosophy since the JITF's inception. Current test processes, procedures and objectives require only minor modification to immediately benefit PMOs developing enterprise and web-based IMAs. The JITF and 497IG are committed to assisting PMOs, regardless of the chosen methodology, to ensure quality software/systems are provided to the users in the field